

Application No.: 10/541,803

Docket No.: 29171/39318A

**REMARKS**

Each of claims 1-24 remains pending in this application, with claims 1 and 10 being independent claims, and claims 7 and 15-24 being withdrawn. With this Response, Applicants amend each of the independent claims and amend the specification. Each of the amendments finds support in the specification and drawings as originally filed and, accordingly, the amendments add no new matter. In view of the amendments above and the remarks below, Applicants respectfully request reconsideration and favorable action in this case.

**35 U.S.C. § 112 Rejections, First Paragraph**

Each of claims 1-6 and 7-14 stands rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. With this Response, Applicants amend the specification, in accordance with the originally filed figures, to explicitly describe certain aspects of the originally filed figures. Each of the aspects now described explicitly by the text of the specification was readily apparent to a person of ordinary skill in the art from the originally filed figures and, therefore, no new matter is added by these amendments. Applicants respectfully request reconsideration and withdrawal of these rejections.

**35 U.S.C. § 112 Rejections, Second Paragraph**

Each of claims 1-6 and 7-9 stands rejected under 35 U.S.C. § 112, second paragraph, as allegedly indefinite for failing to particularly point out the distinctly claim the subject matter which application regards as the invention. With this Response, Applicants amend independent claim 1 and request reconsideration and withdrawal of these rejections.

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**35 U.S.C. § 102/§103 Rejections**

Each of claims 1-5 and 8-14 stands rejected under 35 U.S.C. § 102(a, e) as allegedly anticipated by U.S. Patent Application Publication No. 2002/0080563 of Pence et al. (hereinafter "Pence") and/or under 35 U.S.C. § 103(a) as allegedly obvious over Pence. Each of claims 1-6, 8, and 9 is further rejected as obvious over Pence in view of one or more of U.S. Patent No. 5,836,383 to Zwittig et al. (hereinafter "Zwittig"); U.S. Patent Application No. 5,098,196 to O'Neill; and U.S. Patent No. 5,248,079 to Li.

**Independent Claim 10**

As amended, independent claim 10 recites a plurality of tubes in fluid communication with one another through a plurality of respective intersections, each intersection formed by an incoming tube and a plurality of outgoing tubes, each of the tubes having a radius that is essentially governed by the following relationship:  $r_0^3 = r_1^3 + r_2^3 + r_3^3 + \dots + r_n^3$  where  $r_0$  is the radius of the incoming tube, and  $r_1, r_2, \dots, r_n$  are the radii of the outgoing tubes, wherein, for each of a plurality of intersections, a first outgoing tube is perpendicular to the incoming tube and a second outgoing tube is orthogonal to the first outgoing tube.

Pence is generally directed to heat transport apparatus and methods having consecutively branching flow channels that form branching networks. (See, e.g., Pence at paragraph [0006].) Many of the embodiments of the apparatus and methods described in Pence include a centrally located inlet port, a branching network extending radially outward from the inlet port, and an exit plenum disposed circumferentially around the branching network. (See, e.g., paragraph [0036]; Figs. 1-4 and 9B.) Others of the embodiments described in Pence include branching networks in which progressive branching levels generally direct flow in one direction between first and second parallel surfaces (see, e.g., Figs. 6, 7A, 7C, 7E, 8, and 9A). One embodiment includes a "square fractal-like" branching configuration in which flow is introduced through a termination layer into a centrally located fluid inlet in communication with the largest tubes, passes through the branching configuration to the smallest tubes, and exits through an exit plenum also in the termination layer and

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in flow communication with the smallest tubes. (See, e.g., Fig. 5A; paragraph [0053].)

Pence cannot anticipate amended claim 10 because Pence does not disclose all of the elements recited by the claim and, in particular, fails to disclose **a plurality of intersections each formed by a first outgoing tube perpendicular to the incoming tube and a second outgoing tube is orthogonal to the first outgoing tube**. (Applicants make specific note of the fact that this recitation does not require that every intersection in the heat sink meets this limitation, but instead requires only that “a plurality” of intersections in the device that meet this limitation.) Each of the radial branching networks disclosed in Pence includes intersections in which an axis of a corresponding incoming tube forms an acute angle (i.e., an angle of less than 90 degrees) with the axis of every corresponding outgoing tube. Meanwhile, each disclosed embodiment having generally transverse flow transitions between incoming and outgoing tubes (e.g., Figs. 5A, 6) includes only intersections in which all outgoing tubes at the intersection are perpendicular to the corresponding incoming tube. Thus, Pence does not disclose a plurality of tubes in fluid communication with one another through a plurality of respective intersections... wherein, for each intersection, a first outgoing tube is **perpendicular** to the **incoming** tube and a second outgoing tube is **orthogonal** to the **first outgoing tube**, as amended claim 10 recites. Accordingly, Pence cannot anticipate claim 10.

Additionally, the elements of amended claim 10 are neither disclosed nor suggested by Zwittig, O'Neill, and Li, individually or in any combination with each other and/or Pence. Applicants respectfully submit that such an assertion would be untrue because, even considered together, Pence, Zwittig, O'Neill, and Li fail to disclose or suggest all of the elements of the claim. Specifically, like Pence alone, no combination of these documents discloses or suggests **a plurality of intersections each formed by a first outgoing tube is perpendicular to the incoming tube and a second outgoing tube is orthogonal to the first outgoing tube**. Thus, an assertion that Pence, even in any proper combination with one or more of Zwittig, O'Neill, and Li, would fail to render amended claim 10 obvious.

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For at least these reasons Applicants submit that amended claim 10 is patentable over Pence, individually or combined with one or more of Zwittig, O'Neill, and Li. Accordingly, Applicants respectfully request reconsideration and withdrawal of these rejections.

Independent Claim 1

Similarly to amended independent claim 10, amended independent claim 1 generally requires a plurality of intersections (not every intersection in the unit element) each defined by an incoming flow and a plurality of outgoing flows, a first of which is perpendicular to the incoming flow and a second of which is orthogonal to the first outgoing flow. Specifically, amended claim 1 recites a plurality of flow branch points, each having an incoming flow and a plurality of outgoing flows and each formed by the intersection of two or more of the inlet and outlet tubes...wherein each of the intersections is defined by an incoming flow, a first outgoing flow perpendicular to the incoming flow, and a second outgoing flow orthogonal to the first outgoing flow. As described above, neither Pence alone, nor Pence in any proper combination with Zwittig, O'Neill, and/or Li, discloses or suggests all of the elements recited in amended claim 1. Accordingly, for at least the reasons described above with respect to independent claim 10, Applicants submit that claim 1 is allowable, and request reconsideration and withdrawal of these rejections.

Dependent Claims

Each of claims 2-6, 8, 9, and 11-14 depends, directly or indirectly, from one of independent claims 1 and 10. Accordingly, for at least the reasons described above with respect to the claim from which it depends, Applicants submit that each of claims 2-6, 8, 9, and 11-14 is patentable over Pence, Zwittig, O'Neill, and/or Li, individually or in any proper combination. Applicants respectfully request reconsideration and withdrawal of these rejections.

**Reply Under 37 CFR 1.116  
Expedited Procedure  
Technology Center 3744**

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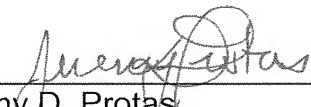
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**CONCLUSION**

Accordingly, all remaining claims are in condition for allowance for the reasons provided above. Although Applicants believe that no fees or petitions are due, the Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 13-2855 of Marshall, Gerstein & Borun, LLP under Order No. 29171/39318A. Should the Examiner wish to discuss any of the foregoing comments or any claim amendments deemed needed to result in allowance, Applicants kindly request the Examiner to contact the undersigned by telephone at the number given below.

Respectfully submitted,

Dated: December 28, 2010

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